

Portal vein injury following endoscopic retrograde cholangiopancreatography: A case report

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ABSTRACT

Endoscopic retrograde cholangiopancreatography (ERCP) has been a widely used procedure in the diagnosis and treatment of various pancreaticobiliary disorders. Although widely considered a safe procedure, ERCP is associated morbidity and occasional mortality. The most common complications include acute pancreatitis, hemorrhage, and duodenal perforation. Portal vein cannulation is a rare complication of ERCP. We described a case of placement of an endoscopic biliary stent in the portal vein during ERCP and sphincterotomy. A 54-year-old female patient underwent laparoscopic cholecystectomy with a pre-diagnosis of chronic cholecystitis with gallstones. She visited emergency unit with the complaint of jaundice and itching on the 4th post-operative day. On the magnetic resonance cholangiopancreatography, the intrahepatic and the extrahepatic bile ducts were dilated and a 7.5×5.5 mm stone at common bile duct. Sphincterotomy was performed by ERCP, the stones were removed, and then a 10F 7 cm stent was installed. Abdominopelvic computed tomography (CT) was performed on the 4th day of ERCP in the patient whose fever and total bilirubin levels persisted at 5 mg/dL, considering cholangitic abscess and/or ERCP complication. On the CT, the proximal end of the stent in the common bile duct was observed to enter into the main portal vein and the tip was observed to be thrombosed. Therefore, it was decided to remove the stent endoscopically under operating room conditions. After the anesthesia induction, the stent was endoscopically removed by the gastroenterology team. The abdominal cavity of patient was explored laparoscopically in the during of stent removal. The patient did not experience hemodynamic instability and did not require transfusion during anesthesia but had melena once on the clinical follow-up. The patient was discharged with low molecular weight heparin and oral cephalosporin and was advised to return for polyclinic control. Doppler ultrasonography (USG) was performed to evaluate the thrombosis of the portal vein in the patient who had intermittent fever during the controls. Doppler USG revealed a thrombosed appearance in the main portal vein and its branches. The patient, who was in good general condition and had no abdominal pain, was switched to high-dose low molecular weight heparin and followed under the control of the gastroenterology and general surgery outpatient clinic. This rare life-threatening complication should always be kept in mind especially during the procedure and/or in the clinical follow-up of the patient.

Keywords: Cholangitis; complication; endoscopic retrograde cholangiopancreatography; portal vein cannulation; thrombosis.

INTRODUCTION

Endoscopic retrograde cholangiopancreatography (ERCP) has been a widely used procedure in the diagnosis and treatment of various pancreaticobiliary disorders. In recent years, with the development of non-invasive imaging methods such as endoscopic ultrasound and in particular, magnetic resonance cholangiopancreatography (MRCP), it has ceased to be

a diagnostic method and started to be used for therapeutic purposes. ERCP has replaced surgery by being used in therapeutic procedures such as in patients with choledocholithiasis, benign and malignant biliary tract strictures, ampullary stenosis, Oddi sphincter dysfunction, post-operative and traumatic ductal injuries, pain management in patients with acute pancreatitis accompanied by cholangitis and chronic pancreatitis, and providing pancreatobiliary drainage. The re-

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ported incidence of ERCP-specific complications ranges from 5% to 40%.^[1] The most common complications are post-ERCP acute pancreatitis (3–10%), hemorrhage (1.3–3.7%), infection (1.9–3.6%), and duodenal perforation (0.1–1%).^[1–5] In addition, various rare complications such as pneumothorax, portal venous air embolism, splenic injury, and colon diverticulum perforation have been reported. Air embolism is rare but can be fatal. This occurs as a result of direct communication with the vascular structure, allowing air to pass into the circulation through a pressure gradient (i.e., through the gastrointestinal (GI) tract or the bile duct). Trauma or inflammation of the bile ducts with contrast administration, insufflation, endoscope, or accessories used during ERCP plays a role in the mechanisms associated with air embolism.^[6,7] Venous air embolism is easily diagnosed by detecting air in the portal vein and can be managed conservatively with IV antibiotics and decompression through the nasogastric tube.

CASE REPORT

A 54-year-old female patient presented with the right upper quadrant pain and swelling that had been present for about 6 months. Physical examination was unremarkable except

for minimal sensitivity with deep palpation of the right upper quadrant. The patient did not have a history of jaundice and the cholestatic enzymes and bilirubin levels were found to be normal. The wall thickness of the gallbladder was within normal limits and multiple stones, the largest of which measured 1 cm, were detected on the upper abdominal ultrasonography (USG). The patient underwent laparoscopic cholecystectomy in October 2020 with a pre-diagnosis of chronic cholecystitis with gallstones in our clinic. Surgical findings revealed a stone sitting in the cystic canal, dilatation in the cystic duct, and increased gallbladder wall thickness. The common bile duct could not be visualized due to extensive inflammation during the operation. The patient whose pathological result revealed xanthogranulomatous cholecystitis with gallstones was discharged on the 1st post-operative day without any problem. On the 4th post-operative day, the patient presented to the emergency unit with the complaint of jaundice and itching. The patient appeared to be icteric on physical examination and her abdominal examination was unremarkable. In the laboratory examinations of the patient, total bilirubin/direct bilirubin values were 8.8/7 mg/dL, AST/ALT: 153/293, ALP/GGT: 490/221, and on the abdominal USG, the intrahepatic

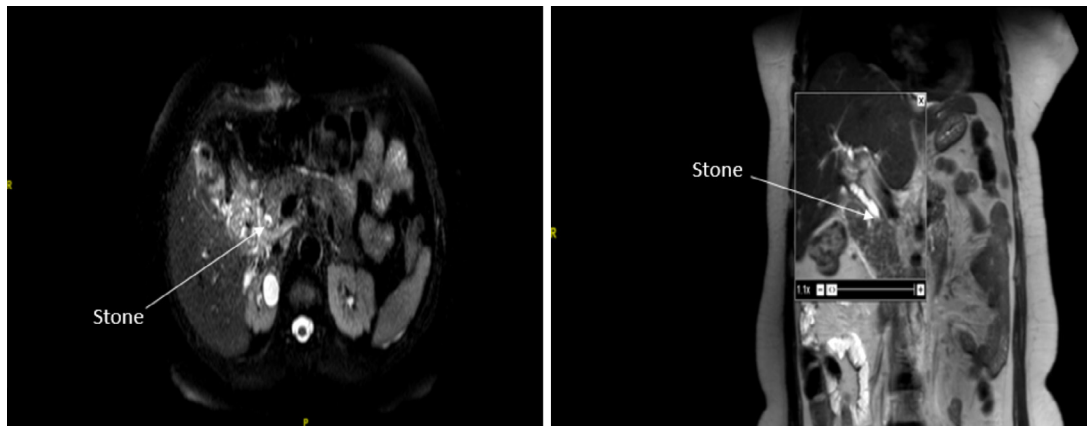


Figure 1. Filling defect in the lumen at the pancreatic cross-section level distal to the common bile duct on MRCP.

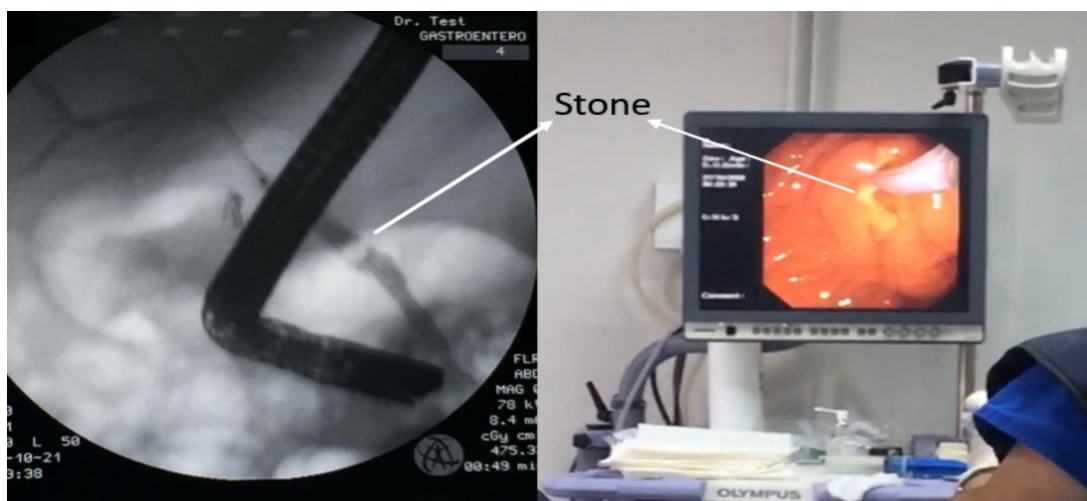


Figure 2. Stone opacity at the common hepatic level and stone falling from the papilla to the duodenum in cholangiography during ERCP.

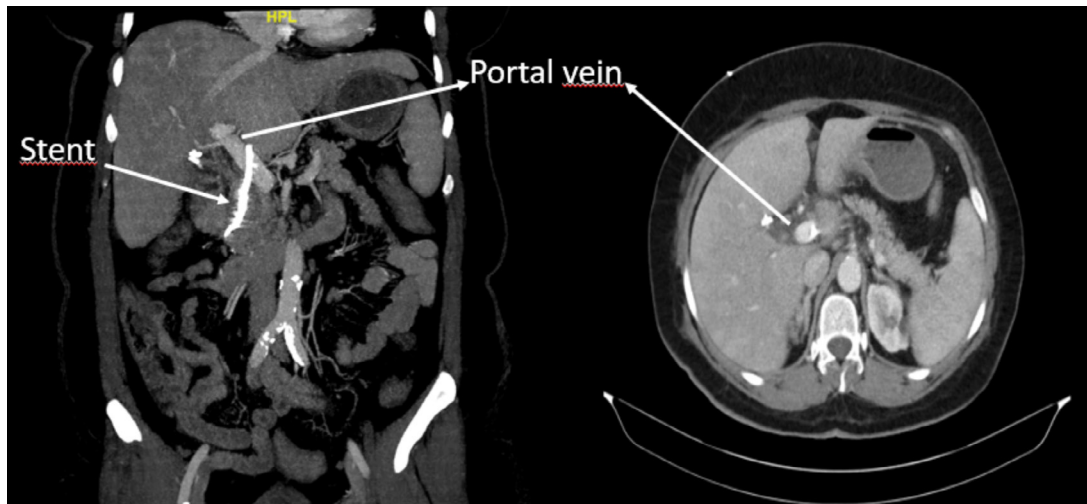


Figure 3. Image of the stent extending into the portal vein.

bile ducts and the proximal part of the extrahepatic bile ducts were observed to be dilated. MRCP was performed on the same day. On MRCP, the intrahepatic and the extrahepatic bile ducts were dilated and an appearance compatible with a 7.5×5.5 mm stone at the level of the pancreatic head was detected (Fig. 1). ERCP was performed on the 2nd day of her hospitalization (Fig. 2). The common bile duct was cannulated with difficulty in ERCP. A 7–8 mm stone was found in the middle part of the common bile duct. A yellow-white purulent liquid flow into the lumen was observed. Sphincterotomy was performed, the stones were removed, and then a 10F 7 cm stent was installed. The procedure was terminated with the decision that the hemorrhage was due to sphincterotomy and stone extraction in the patient, who also had some bleeding (Fig. 2).

Third-generation cephalosporin and anti-anaerobic antibiotic therapy was begun on admission and this was switched to carbapenem considering the presence of cholangitis due to the onset of fever after ERCP. Abdominopelvic computed tomography (CT) was performed on the 4th day of ERCP in the patient whose fever and total bilirubin levels persisted at 5 mg/dL, considering cholangitic abscess and/or ERCP complication. On the CT, heterogeneous enhancement was observed in the liver and the proximal end of the stent in the

common bile duct was observed to enter into the main portal vein and the tip was observed to be thrombosed (Fig. 3).

The patient had thrombocytopenia, borderline INR, and persistent bilirubin values on the control examination and had fever only as active complaints. There was a left shift in the peripheral smear carried out for thrombocytopenia and toxic granulation. MRCP was performed again to clearly reveal the stent in the biliary tract and to clarify whether there was another pathology in the biliary tract. Bile duct pathology was not detected on MRCP. Portal vein Doppler USG performed on the same day revealed a hyperechoic foreign body causing a filling defect in the main portal vein. Flow in the left portal vein was not encoded and the right and main portal vein flow was patent. Therefore, it was decided to remove the stent endoscopically under operating room conditions after having made the necessary preparations. The patient was taken to the operating room on the 6th day after ERCP. Considering the possibility of portal vein injury developing during stent withdrawal, possibly leading to intra-abdominal bleeding, simultaneous laparoscopic exploration with ERCP was also planned. After the anesthesia induction, the patient was explored laparoscopically. The portal hilus was revealed. Subsequently, the stent was endoscopically removed by the gastroenterology team (Fig. 4). A JP drain was placed in the abdomen of the patient who had approximately 300 cc of upper GI bleeding after the stent removal and who did not demonstrate intra-abdominal bleeding in laparoscopy. The patient was followed-up for 20 min to see that there was no active bleeding endoscopically. Following termination of endoscopy, the patient was awakened and placed on observation.

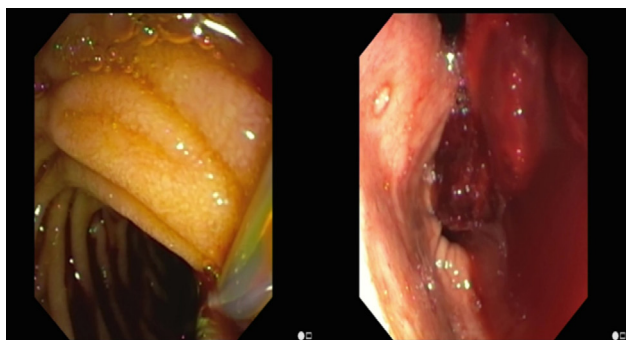


Figure 4. Pre-operative endoscopic withdrawal of the stent and leaking blood seen in the stomach.

The patient did not experience hemodynamic instability and did not require transfusion during anesthesia but had melena once on the clinical follow-up. The thrombocytopenia of the patient improved, the abdominal findings were completely stable, she was hemodynamically stable and there was no

decrease in the complete blood count values. The JP drain placed in the abdomen was removed on the 1st post-operative day. On the doppler USG performed on the 2nd post-operative day of the patient, the flow was encoded in the main portal vein and its branches. The patient who did not have high fever and whose oral intake and abdominal findings were good, was discharged with low molecular weight heparin and oral cephalosporin, and was advised to return for polyclinic control. On the doppler USG performed on the patient who described intermittent fever during his controls, normal control values of thrombocytes, INR, bilirubin, and regression of cholestatic enzymes, findings consistent with chronic thrombus in the main portal vein, and its branches were detected and on this finding, IV contrast-enhanced CT angiography was performed. On the CT angiography, a thrombosed appearance in the main portal vein, in the intrahepatic branches of the portal vein, in the 1/2 part of the splenic vein close to the portal venous confluence and in the superior mesenteric vein adjacent to the portal confluence, and aerial images within the main portal vein, were observed. The patient whose general condition was good, who did not have abdominal pain, and whose abdomen was comfortable was prescribed high-dose low-molecular weight heparin and was followed-up through gastroenterology and general surgery outpatient clinic control.

DISCUSSION

Cannulation of the portal vein is a rare complication of ERCP and occurs in one out of 6000–8000 procedures.^[6] It is stated in the literature that this complication generally occurs in malignant patients and especially as a result of difficult cannulation of the common bile duct.^[8,9] The presence of hemorrhage during the procedure or hemorrhage during the aspiration on cannulation should be thought-provoking in terms of this complication. It has also been emphasized that unknown fistulae between the biliary system and the portal system are likely to cause this situation.^[10] When a relationship occurs with the portal system, the most feared scenario is air embolism. It also carries potential risks such as bleeding, sepsis, and thrombosis.^[6] Aspiration of the canal before contrast injection can aid a quick diagnosis.

In our patient, we think that the stone in the common bile duct eroded the common bile duct wall with inflammation, and the traumatic procedures during cannulation opened this tract by the stent placed during ERCP. The absence of severe hemorrhage and difficulty in common bile duct cannulation during the ERCP procedure is open to interpretation in these rare cases. As stated in the literature, we encountered sepsis and thrombosis after this situation in our patient, and this rare complication, which may not have appeared, was revealed on the examinations. The proximal end of the stent being inside the portal vein not allowing bile drainage explains the patient's persistent bilirubinemia, while thrombocytopenia accompanying fever clearly reveals this picture with its

distal end being in the duodenum and causing continuous bacteremia and cholangitis due to its relationship with the portal system.

The absence of severe hemorrhage during the ERCP procedure and the opacification of the bile ducts on cholangiography did not suggest this complication that may occur during the procedure. Delayed awareness manifested itself with portal vein thrombosis in the following period for this patient. This patient was followed-up to see if recanalization would occur for thrombus in the portal vein.

Conclusion

This rare complication after ERCP can be life-threatening. This rare life-threatening complication should always be kept in mind, especially during the procedure and/or the clinical follow-up of the patient. In portal vein cannulations that are noticed during and after the procedure, withdrawal of the biliary catheter as soon as possible seems to be the most appropriate option.

Informed Consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

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OLGU SUNUMU - ÖZ

Endoskopik retrograd kolanjiyopankreatografi sonrası portal ven yaralanması: Olgu sunumu

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Endoskopik retrograd kolanjiyopankreatografi (ERCP), çeşitli pankreatikobilier bozuklukların tanı ve tedavisinde yaygın olarak kullanılan bir prosedür olmuştur. Yaygın olarak güvenli bir prosedür olarak kabul edilmesine rağmen, ERCP morbidite ve nadiren mortalite ile ilişkilidir. En sık görülen komplikasyonlar arasında akut pankreatit, kanama ve duodenal perforasyon bulunur. Portal ven kanülasyonu, ERCP'nin nadir bir komplikasyonudur. Biz, ERCP ve sfinkterotomi sırasında portal vene endoskopik biliyer stent yerleştirilmesi olgusunu tanımladık. Elli dört yaşında kadın hastaya kronik taşlı kolesistit ön tanısı ile laparoskopik kolesistektomi yapıldı. Ameliyat sonrası dördüncü gün sarılık ve kaşıntı şikayeti ile acil servise başvurdu. MRCP'de intrahepatik ve ekstrahepatik safra yolları dilate ve ana safra kanalında 7.5x5.5 mm'lik bir taş vardı. ERCP ile sfinkterotomi yapıldı, taşlar çıkarıldı ve ardından 10F 7 cm stent yerleştirildi. ERCP'nin dördüncü gününde ateş ve total bilirubin düzeyi 5 mg/dl'de sebat eden hastaya kolanjitik apse ve/veya ERCP komplikasyonu düşünülerek abdominopelvik bilgisayarlı tomografi (BT) çekildi. BT'de koledok içindeki stentin proksimal ucunun ana portal vene girdiği ve ucunun tromboze olduğu izlendi. Bu nedenle ameliyathane şartlarında stentin endoskopik olarak çıkarılmasına karar verildi. Anestezi induksiyonunun ardından stent gastroenteroloji ekibi tarafından endoskopik olarak çıkarıldı. Stent çıkarılırken hastanın karın boşluğu laparoskopik olarak eksplore edildi. Anestezi sırasında hemodinamik instabilite gelişmeyen ve transfüzyon gerektirmeyen hasta, klinik takibinde bir kez melenası oldu. Hasta düşük molekül ağırlıklı heparin ve oral sefalosporin ile taburcu edildi ve poliklinik kontrolü önerildi. Kontrolleri sırasında aralıklı ateş şikayeti olan hastaya yapılan portal vendeki trombozu değerlendirmek için Doppler USG yapıldı. Doppler USG'de ana portal vende ve dallarında tromboze bir görünüm saptandı. Genel durumu iyi olan, karın ağrısı olmayan hastada, yüksek doz düşük molekül ağırlıklı heparine geçilerek gastroenteroloji ve genel cerrahi poliklinik kontrolünde takibe alındı. Nadir görülen hayatı tehdit eden bu komplikasyon özellikle işlem sırasında ve/veya hastanın klinik takibinde daima akılda tutulmalıdır.

Anahtar sözcükler: Endoskopik retrograd kolanjiyopankreatografi; kolanjit, komplikasyon; portal ven kanülasyonu; tromboz.

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